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INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

25X1

S-E-C-R-E-T

COUNTRY Hungary

SUBJECT Berente Power Plant

REPORT

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SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

[redacted] six-page report on the Berente power plant, with emphasis on a description of the technical equipment such as boilers, turbines, generators, regulators, transformers, etc. The following illustrations accompany the report:

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1. Water conditioning unit (layout sketch);
2. Power plant with technical equipment (layout sketch);
3. Automatically operated boiler (commercial print);
4. Long-distance view of Berente power plant (photograph);
5. Boiler room and smokestack (photograph);
6. Boiler and turbine rooms (photograph);
7. Berente railroad yards and power plant (photograph);
8. Village of Berente and incomplete gas plant (photograph);
9. Coal storage yard and conveyor system (photograph);
10. Coal storage yard, coal-sorting plant, nitrogen plant, and barracks for laborers (photograph);
11. Coal storage yard, conveyor system, coal-sorting plant, and towers of nitrogen plant (photograph).

[redacted]

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ENCLOSURE ATTACHED
PLEASE ROUTE

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(Note: Washington distribution indicated by "X"; Field distribution by "#".)

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1. The Berente Thermal Power Plant is located outside the village of Berente, Hungary (48 14 N; 20 40 E), just off the road between Berente and Sajoszentpeter (48 13 N; 20 43 E). The power plant building in which the technical equipment is housed is a concrete structure, most of which was poured at the site. The only other separate structure in connection with the power plant is the building in which the water used to produce steam for the power plant is cleaned and prepared. This building is also of concrete. Construction of the power plant is believed to have commenced sometime during the latter part of 1952. Since most of the DDR technicians who are erecting and adjusting the technical equipment at the plant are scheduled to return to their respective firms in the DDR about the end of March 1957 it is believed that the project will be completed and in full operation by that time. Reportedly the Berente power plant will be the largest in Hungary and will produce 210,000 KWH of electricity. Attention is invited to the attached photographs of the power plant taken during various stages of its construction, and the immediate surrounding area.

2. Use to which the elctrical product will be put: The electricity produced by the Berente power plant will be put to the following uses. The power plant will be tied into and all power delivered to the ring net (grid) surrounding Budapest. Power from the plant will also be used in the electrification of the Budapest/Miskolcz railroad, which will be electrified by an overhead power-line system. Power will also be produced for export and at the time of the observation power from Berente was being exported to Czechoslovakia. Reportedly the export to Czechoslovakia at that

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time was for the purpose of accumulating Czech currency exchange to help pay for the turbine equipment installed at Berente, which was of Czech origin.

3. Water Supply: Water for the power plant is drawn from two local sources. The main source of water supply is a huge underground lake located in the immediate vicinity of Berente, from which water is sucked up directly to the water preparation building, which is indicated on one of the attached sketches. It was reported that the underground lake is so large that even during extremely dry years there will be no shortage of water. A secondary source of water for the plant is the Sajoszentpeter stream which flows directly by the plant. The water preparation plant will also supply sufficient drinking water for the village of Berente.

4. Fuel: Either coal or fuel oil can be utilized for fuel at the Berente power plant as the boilers are constructed for conversion to either type of fuel. Basically lignite or brown coal will be utilized for fuel because oil is too expensive. Most of the coal is supplied from local mines which are at a distance of about 3 km, however, since this source of coal does not supply a sufficient amount or quantity, some coal is brought in by railroad. The source of these additional requirements is unknown.

5. Technical Equipment: The power plant when completed will have ten boilers and six turbines and other technical equipment as follows:

   a. Boilers: The boilers are the product of the VEB Bergmann-Borsig, which is located in Wilhelmsruh in East Berlin. The boilers were installed, however, by an unknown VEB

firm located in Cottbus in the DDR. The boilers are all brand new and are capable of producing 100 tons of steam per hour at 82 atu. At the time of the last observation six boilers were completed and in operation, two were under construction, and the other two were at the plant but were not yet [redacted] installed. The type of boiler in use at Berente is commonly referred to as the Kohlenstaub - or Muehlenstaubkessel (coal dust boilers). The only difference between the boilers at Berente and the boiler indicated on the attached prospectus is that instead of three mechanisms for beating coal into coal dust the boilers at Berente have four such mechanisms, one at each corner, as indicated on attached sketch.

b. Turbines: The turbines are of Czech origin, however, the name of the firm which constructed them is unknown. They were installed by Hungarian technicians. At the time of the last observation the installation of three turbines had been completed, and they were in operation. The installation of the three additional turbines had not yet commenced. Each turbine is capable of producing 35,000 KWH of power. All turbines were brand new.

c. Generators: The generators, of which there are also six, were also of Czech origin, however, the firm which produced them is unknown. No further information is known concerning the generators. At the time of the last observation three of the generators were installed and in operation, while installation of the remaining three had not yet commenced. The generators were all brand new.

d. Automatic Regulating and Measuring Apparatus: The automatic regulating and measuring apparatus for the boiler system is the product of the VEB Geraete- und Regler-Werke Teltow, which is located near East Berlin. The regulating and measuring apparatus was installed at Berente by this same firms technicians. A prospectus showing this equipment and giving some of its technical aspects is attached.

e. Transformers: Six brand-new transformers, of unknown origin, were installed by Hungarian technicians. No further information is known concerning the transformers.

f. Water Preparation Unit: The water preparation and cleaning unit, which is located in a separate building, is the product of the VEB Rathenau, which is located in East Berlin. This same firm's technicians also installed the water preparation and cleaning equipment. No further information is known about this equipment.

g. Turbo-pumps and Electro-pumps: A total of 8 turbo-pumps and 4 electro-pumps, all brand new, were installed by technicians from the firm VEB Turbo-Dresden, the same firm which produced them. Nothing further is known about this pumping equipment.

h. High-pressure Pipes (Hochdruckleitungen): All high-pressure pipes at the plant were installed by Rohrleitungsbau-FINOW of East Berlin. 25X1 All of the high-pressure pipes [redacted] are constructed of steel, have a diameter [redacted] of about 315 mm, and a thickness of from 12 to 14 mm. [redacted] 25X1

25X1

i. Fuel Conveyor-belt System: The fuel conveyor-belt system, which conveys fuel coal from the open-air coal-yard at the plant, to coal hoppers over the boilers, was constructed by the firm VEB-Stahlbau Leipzig. No further information is known about the conveyor-belt system. Attention is invited to several of the attached photographs which show the adjacent coal-yards and the conveyor-belt system.

6. Future Plans: The present main building is approximately 40 meters in width by approximately 120 meters in length and has three smokestacks, each of which was estimated to be about 45 meters in height. At the time of the last observation only two of these smokestacks had been completed, however, the third stack was about half completed. The south wall of the main power plant building, in which the boilers and turbines are housed, is not of permanent construction, but only a temporary structure. This was done because plans call for eventual enlargement of the building with sufficient space for two more boilers and one more turbine. This will, of course, require the construction of one additional smokestack. 25X1

7. Plant Management: The Hungarian general manager of the plant was Ing. Janos VARGA.

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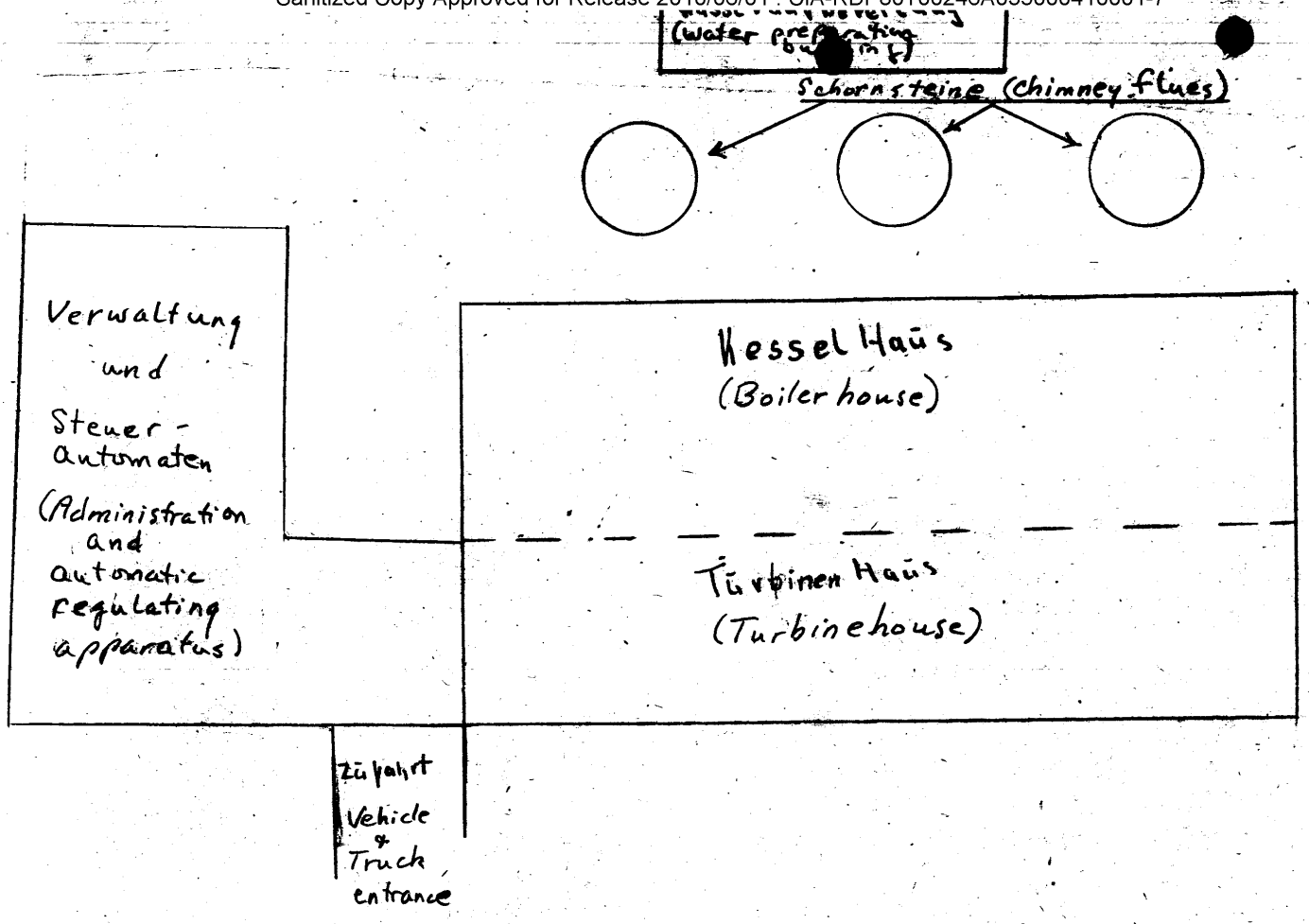
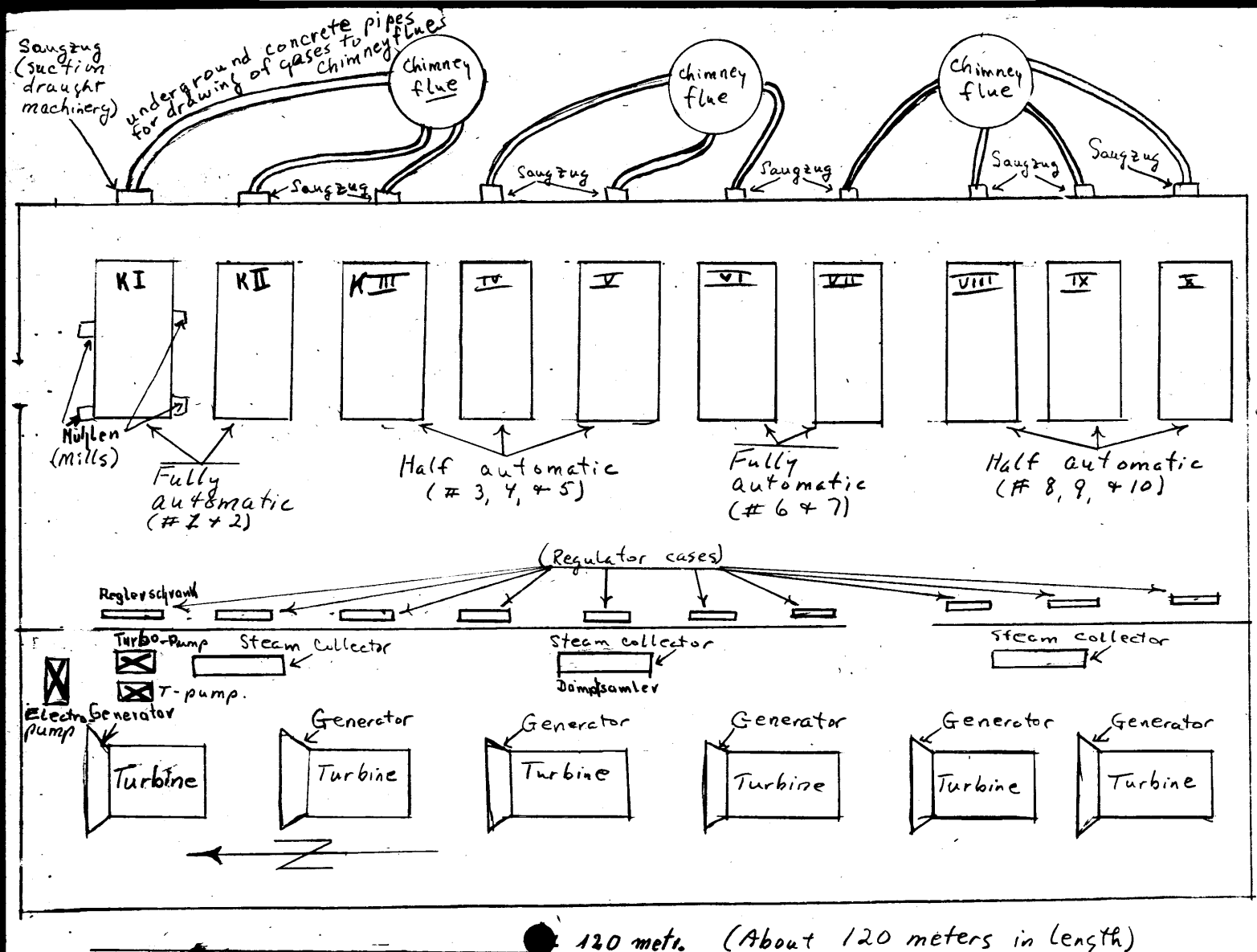
8. Photographs, a prospectus, and sketches are attached.



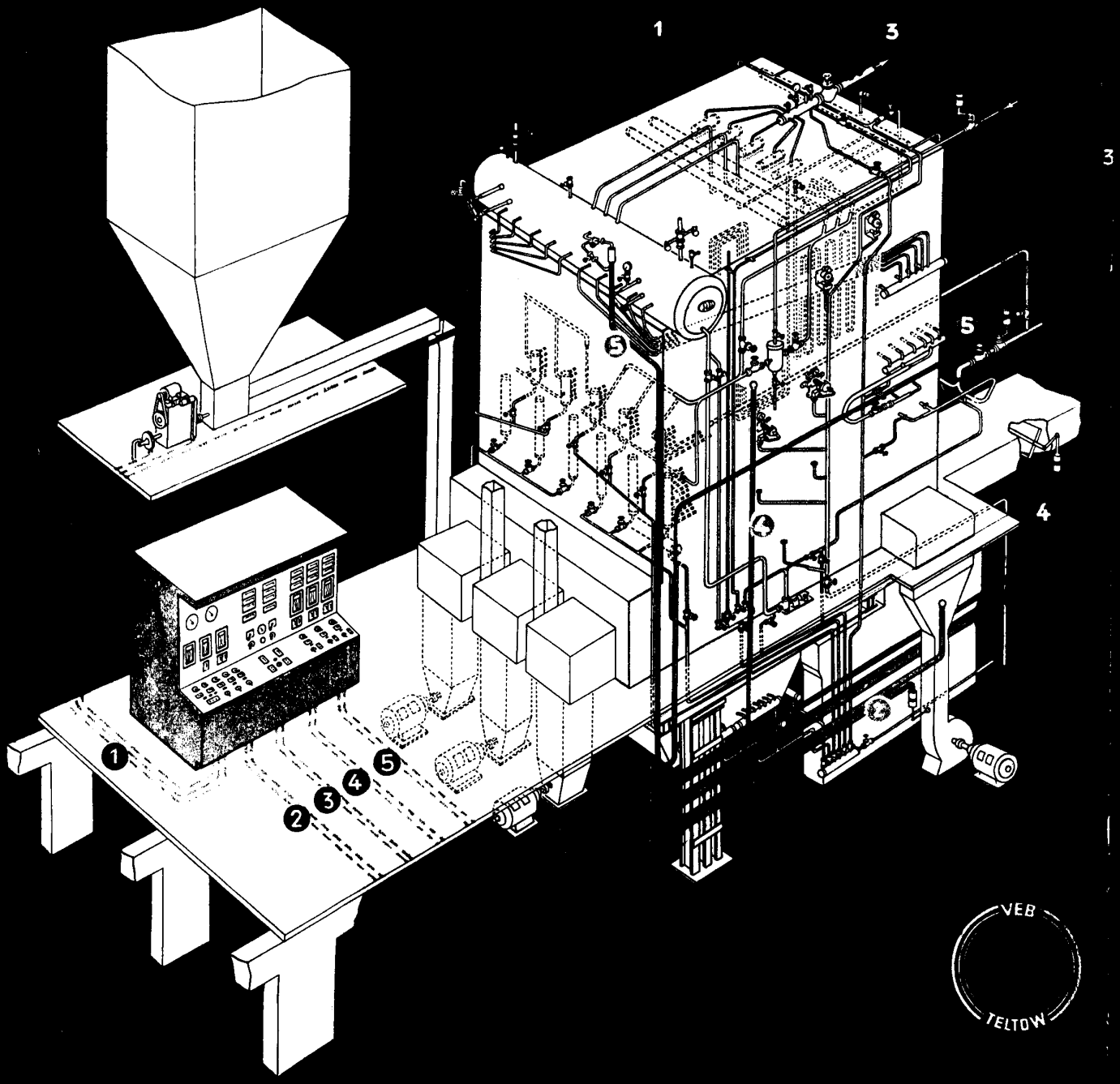
General layout sketch of the Berente Thermal Power Plant.



Sketch of the Berante Thermal Power Plant showing approximate location of technical equipment.

~ 120 metr. (About 120 meters in length)

VOLLAUTOMATISCHE KESSELREGELUNG



	Regler für	Régulateur	Gobernador	Control of	Регулятор
1	Belastung	de charge	de carga	Fuel feed	нагрузки
2	Verbrennungsluft	d'air de combustion	del aire de combustion	Combustion	воздуха горения
3	Heißdampftemperatur	de température de vapeur surchauffée	de la temperatura del vapor recalentado	Desuperheating	температуры горячего пара
4	Feuerraumdruck	de pression de foyer	de la presión en el fogón	Furnace draught	давления топочной камеры
5	Wasserstand	de niveau d'eau	del nivel de agua	Feed water level	уровня воды

Kurze technische Beschreibung der umseitig dargestellten Regelung eines Dampfkessels mit Mühlenfeuerung.

Die Anpassung der Dampferzeugung an den Dampfbedarf ist insbesondere bei plötzlichen größeren Lastschwankungen eine Aufgabe, die durch reinen Handbetrieb schwer bewältigt werden kann. Die hierdurch bedingten Unregelmäßigkeiten in der Feuerung verursachen Wirkungsgradverluste; die Kessel werden mit ihren Feuerungseinrichtungen stärker beansprucht und die dabei unvermeidlichen Dampfdruckschwankungen wirken sich nachteilig für den Betrieb des Kraftwerkes aus. Durch eine automatische Regleranlage kann nun unabhängig von Lastschwankungen stets das Gleichgewicht zwischen der Wärmezufuhr durch die Brennstoffe und der Wärmeabgabe durch die erzeugte Dampfmenge aufrechterhalten werden. Die dargestellte Regleranlage, die natürlich nur als Beispiel aus der Vielzahl von möglichen Ausführungsarten angesehen werden kann, hat innerhalb des durch die Feuerungseinrichtungen zugelassenen Lastbereiches folgende Aufgaben zu erfüllen:

1. Die dem Kessel in Form von Brennstoff unter Zugabe von Luft zugeführte Energie dem Wärmebedarf anzupassen.
2. Das Verhältnis von Brennstoff und Verbrennungsluft so einzustellen, daß bei jeder Belastung eine wirtschaftliche Verbrennung gewährleistet ist.
3. Eine bestimmte Dampftemperatur hinter den Dampfkühlern einzuhalten.
4. Entsprechend den Betriebsverhältnissen einen konstanten Druck im Feuerraum aufrechtzuerhalten.
5. Einen bestimmten Wasserstand in der Kesseltrommel einzuhalten.

Der links vor dem Kessel stehende Regler- und Überwachungsschrank enthält außer den für die obigen Regelaufgaben erforderlichen Reglersteuerwerken eine Reihe von anzeigenden, registrierenden und signalisierenden Instrumenten und Geräten für die Betriebsüberwachung, ferner alle Bedienungselemente wie Schalter, Fernsteuerhähne, Meßstellenschalter usw. Dem Kessel sind drei Kohlenstaubmühlen zugeordnet, die den Brennstoff aus Bunkern über Kohlenzuteiler zugeführt erhalten. Von diesen Bunkern und Zuteilern ist in der Abbildung nur je einer dargestellt.

Im folgenden soll die Funktion der einzelnen Regler in der oben angeführten Reihenfolge kurz beschrieben werden.

1. Belastungsregelung

Diese Regelung hat die Aufgabe, die Brennstoffzufuhr zu den Mühlen und damit zu dem Kessel der jeweiligen Belastung entsprechend anzupassen, wobei angenommen sei, daß nur ein Kessel vorhanden und zu regeln ist (bei mehreren Kesseln ist der Einsatz eines Kommandogebers erforderlich). Im vorliegenden Falle sind ein Hauptbelastungsregler und drei Belastungsregler vorgesehen. Der erstere erhält seinen Impuls aus der Heißdampfleitung und bewirkt bei Laständerungen und dem sich daraus ergebenden Druckabfall bzw. -anstieg über einen Stellzylinder mit gekuppeltem Impulsgebergestänge die Impulsabgabe an die einzelnen Belastungsregler. Jeder dieser Belastungsregler betätigt einen Stellzylinder, der das regelbare Getriebe am Kohlezuteiler der jeweiligen Belastung entsprechend verstellt. Zur Erfassung der zugeführten Kohlenmenge dient je ein mit dem Kohlezuteiler gekuppelter Meßkompressor, dessen Meßluft-Fördermenge über Stauränder auf das Meßsystem des Belastungsreglers geleitet, die Stabilisierung des Regelvorganges bewirkt. Die Rückführung am Hauptbelastungsregler erfolgt durch Kupplung mit dem vorerwähnten Impulsgebergestänge.

2. Verbrennungsregelung

Der Verbrennungsregler hat die Aufgabe, eine der Belastung bzw. der zugeteilten Kohlenmenge entsprechende Verbrennungsluftmenge durch Verstellen einer Drosselklappe in der Frischluftzuleitung des Kessels auszusteuern. Dieser Regler erhält seinen Impuls von einem Summierungsstaurand, an welchem die von den drei Meßkompressoren kommenden Meßluftmengen zusammengeführt werden und die das Maß für die Gesamt-Kohlenmenge darstellen. Der auf das Meßsystem des Reglers geleitete Differenzdruck bewirkt, daß der vom Reglersteuerwerk betätigte Stellzylinder die Drosselklappe in der Frischluftzuleitung so verstellt, daß dem Kessel die erforderliche Luftmenge zugeführt wird. Das dem Heizwert des Brennstoffes entsprechende günstigste Brennstoff-Luftmengen-Verhältnis kann am Regler genau eingestellt werden. Der zur Stabilisierung benötigte Rückführwert wird als Differenzdruck von Meßstellen vor und nach dem Luftvorwärmer abgenommen und auf das zweite Meßsystem des Reglers geleitet.

3. Heißdampftemperatur-Regelung

Durch diese Regelung erreicht man, daß eine bestimmte Heißdampftemperatur innerhalb enger Grenzen hinter dem Dampfkühler aufrechterhalten wird. Der Regler besteht aus einem Anbauthermostaten mit einem Quarzstab, der zusammen mit dem Steuerwerk an der Heißdampfleitung befestigt ist.

Durch die unterschiedliche thermische Längenausdehnung der Rohrleitung und des Quarzstabes wird das Strahlrohr ausgelenkt und das mit dem Stellzylinder gekuppelte Regelventil in der Kühlwasserzuleitung so lange verstellt, bis die eingestellte Temperatur hinter dem Dampfkühler wieder erreicht ist.

4. Feuerraumdruckregelung

Um die Rauchgasabfuhr zu sichern und ein Qualmen des Kessels zu verhindern, muß bei allen Belastungen ein konstanter Unterdruck im Feuerraum aufrechterhalten werden. Der Regler erhält den Impuls aus dem Feuerraum und wirkt auf eine Drosselklappe im Rauchgaskanal. Der Regler arbeitet stabil und benötigt keine besondere Rückführungseinrichtung.

5. Wasserstandsregelung

Die Wirkungsweise dieses Reglers beruht auf dem Prinzip der Vergleichsmessung zwischen einem konstanten Wasserspiegel in einem mit der Kesseltrommel verbundenen Kondensgefäß und dem veränderlichen Wasserspiegel in der Trommel. Jede Veränderung in der Höhendifferenz zwischen den beiden, auf ein Hochdruckmembran-Meßsystem wirkenden Wassersäulen bewirkt eine Auslenkung des Strahlrohres und damit eine Verstellung des mit dem Speisewasser-Regelventil verbundenen Stellmotors.

VEB GRW TELTOW

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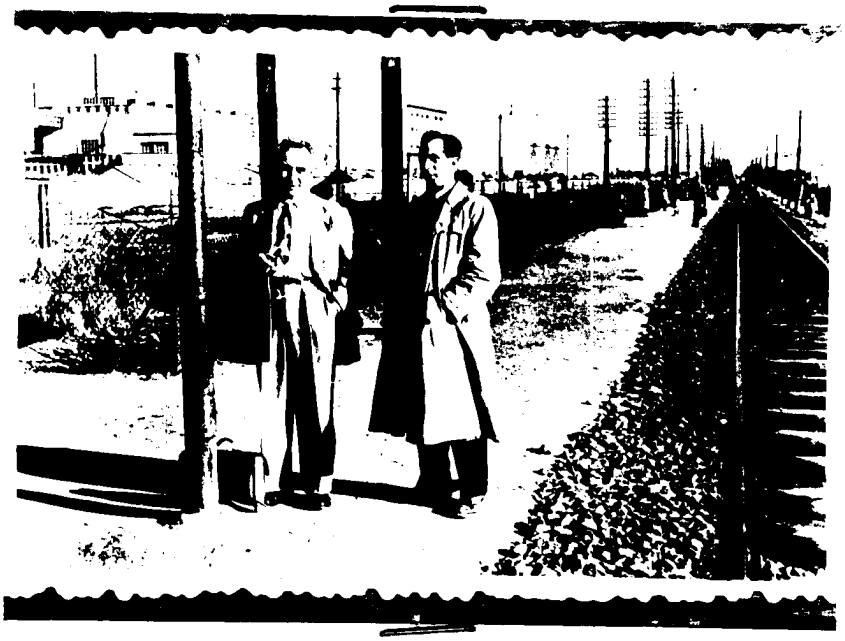
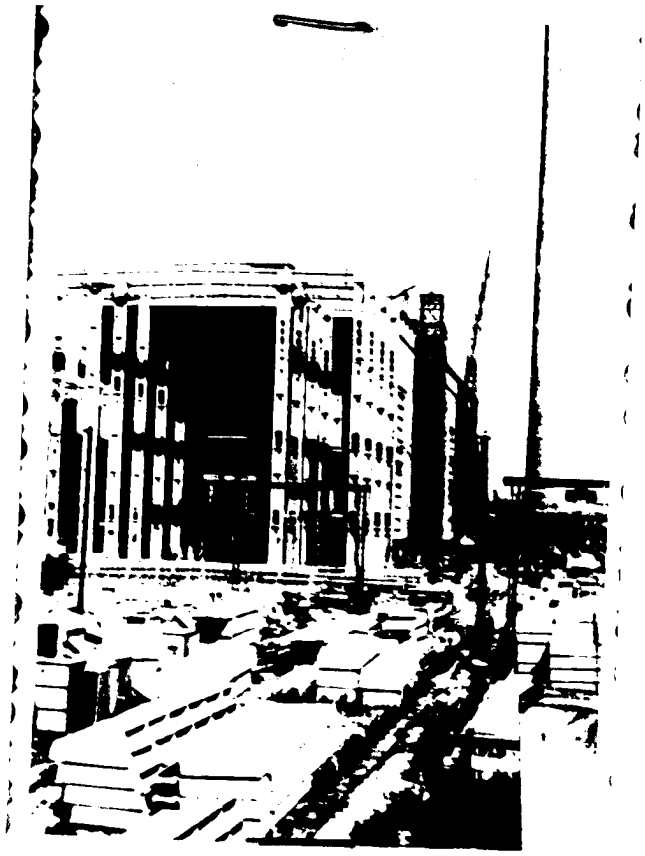
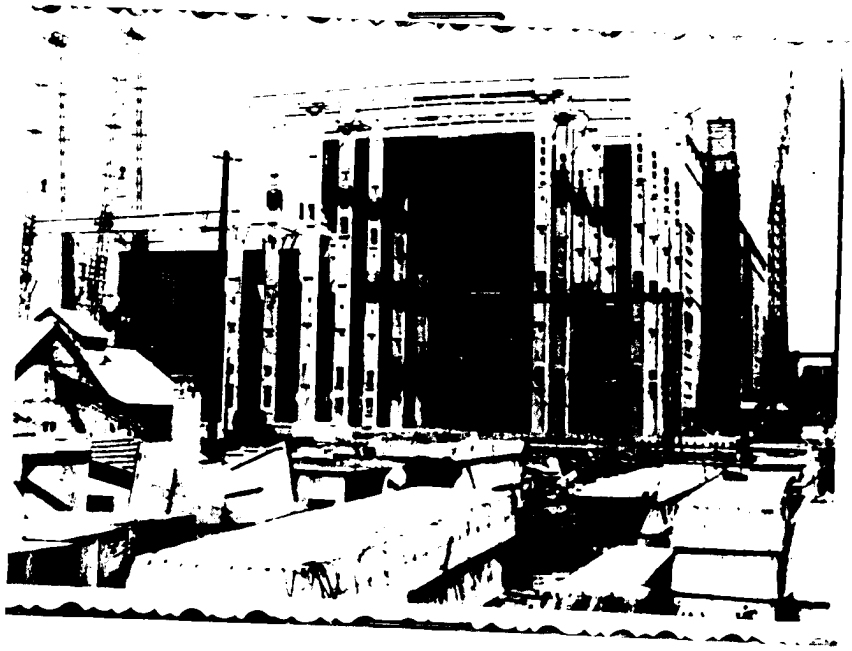


Berente railroad station (sign visible just over the head of person to the right in the foreground). Berente power plant visible at upper left corner of photograph as it looked about the end of 1955.



Power plant at Berente showing the boiler room and smokestack. Photograph taken about May 1955. The smokestacks are along the East side of the building. The open end of the boiler-room shown in the photograph is the South end of the building.



Berente power plant showing the boiler and turbine rooms from the South end of the building. The high masts shown on both sides of the building are construction cranes which were in use during the construction of the building. Photo taken May 1955. Boiler visible in the boiler-room.

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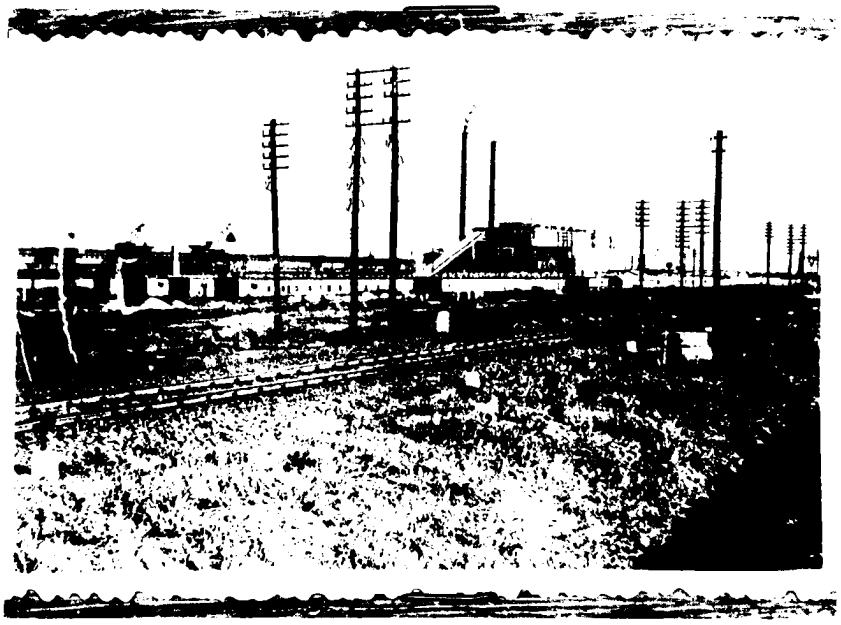
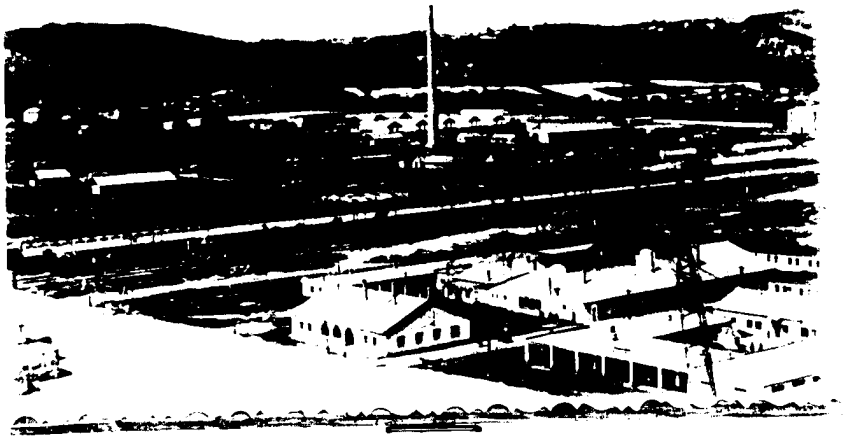
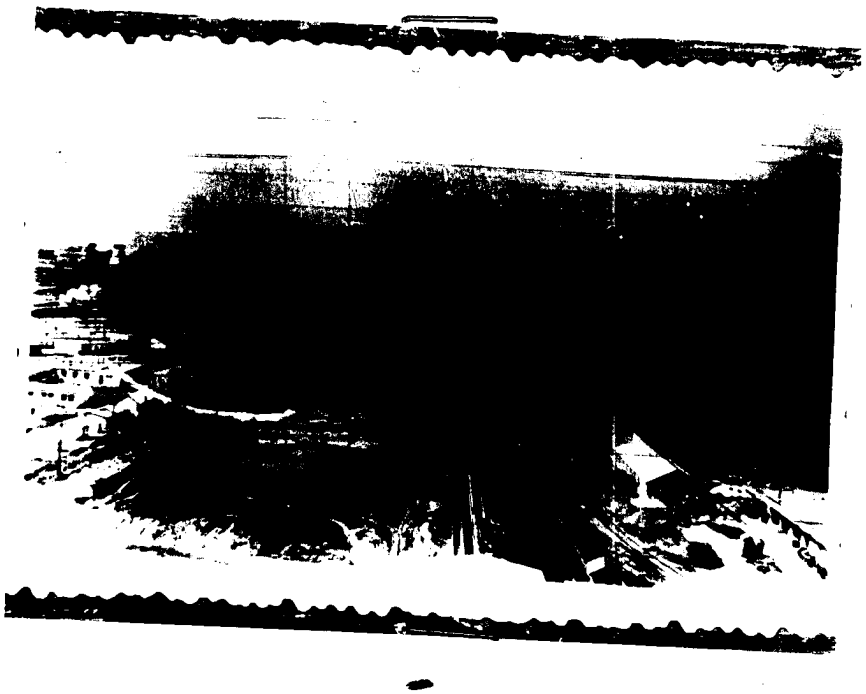


Berente railroad yards in foreground. Berente power plant visible just to right of centerground. Two smokestacks completed, third about half completed at the time the photograph was taken. This is a view of the North and West sides of the building. Photo taken either during October 1955, or shortly thereafter.



Village of Berente in the background. Smokestack in the centerground is part of a gasplant which was under construction but which was never completed. Barracks in the foreground were used to house laborers working at the power plant.



Berente power plant coal storage yards are shown in the foreground of the photograph. To the right of the coal storage yards, running from the centerground to the foreground of the photograph, is the fuel conveyor-belt system for conveying coal from the coal yards to the power plant hoppers. The two circular towers in the left background of the photograph are part of a nitrogen plant located at Berente. The triangular shaped construction, the conveyor system, and the large construction to the right of the triangular construction, shown approximately in the centerground of the photograph, are all part of a coal sorting plant (tipple) in Berente.

Berente power plant coal storage yards - right foreground.

Coal sorting plant (tipple) - right centerground.

Two circular towers in the centerground are part of the nitrogen plant located in Berente.

Barracks in left foreground were used to billet laborers working at the Berente power plant during its construction.

Berente power plant coal storage yards in centerground of photograph. Right, foreground of photograph shows the conveyor-belt system used for conveying coal to the power plant hoppers. The coal sorting (tipple) plant is shown in the back centerground of the photograph. The two circular towers of the nitrogen plant are shown in the left background of the photograph. (NOTE: The coal sorting plant is a separate installation from the power plant and has no direct connection with the power plant).

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